F·A·A·M facility for airborne atmospheric measurements

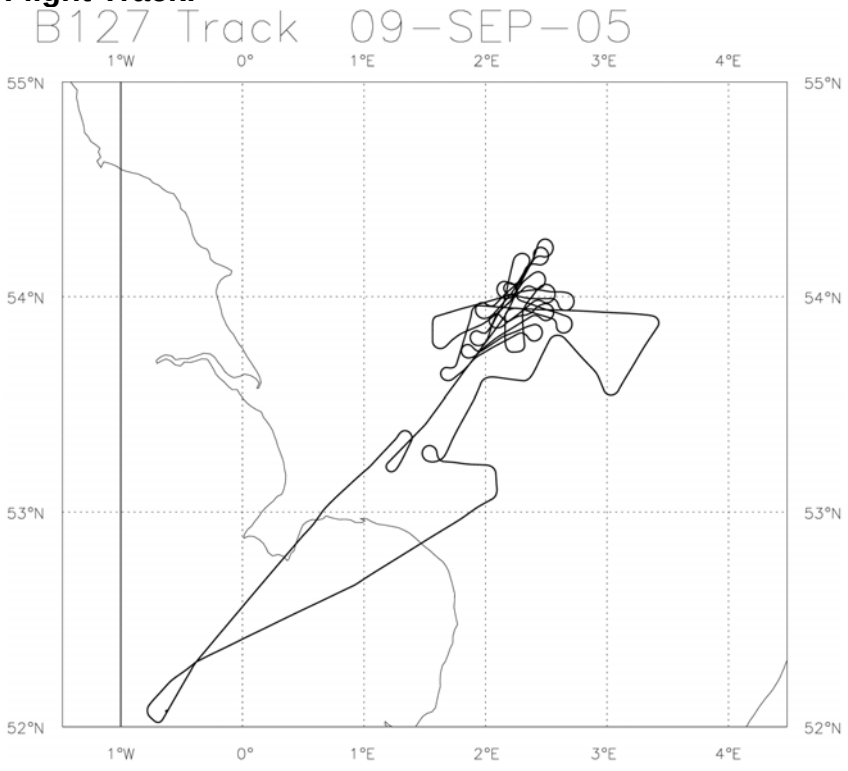
FLIGHT FOLDER

Flight No.:	B127
Date:	09 Sep 2005
Take Off	11:00:24
Landing:	15:24:05
Flight Time	4h23m41

Campaign: ICEPIC
Operating Area: Southern area North Sea

POB	Position	Name	Institute
1	Captain	Alan Roberts	Directflight
2	Co-pilot	Ian Ramsay-Rae	Directflight
3	CCM	Jackie Mulholland	Directflight
4	Mission Scientist	Jonathan Smith	Leeds University
5	Flight Manager	Jim Crawford	FAAM
6	CVI / CCM2	Paul James	FAAM
7	Cloud Physics	Martyn Pickering	Met Office
8	AMS	Gerrard Capes	Manchester University
9	CCN	Jonny Crosier	Manchester University
10	FWVS	James Bowles	Met Office
11	ADA - CPI	Martin Gallagher	Manchester University
12			
13			
14			
15			
16			
17			
18			
19			
20			

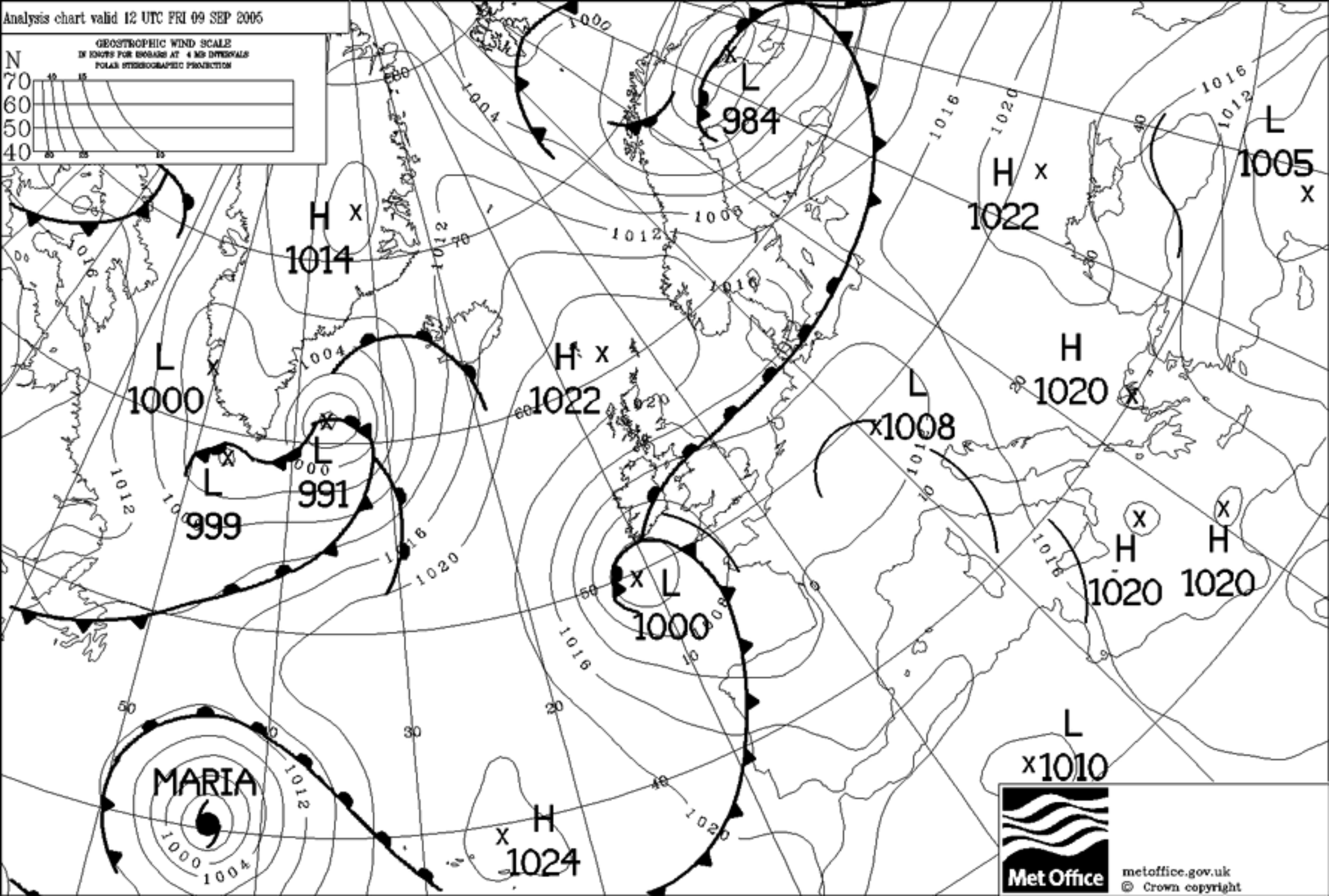
Flight Track:



FLIGHT SUMMARY

Flight No b127
Date: 09 September 2005
Project: ICEPIC
Location: southern area, north sea

Start Time	End Time	Event	Height (s)	Hdg	Comments
103108		INU	0.42 kft	126	INU to nav
103233		DRS	0.42 kft	126	DRS check OK
110024		T/O	7.0 kft	055	Cranfield
111159		J/W NEV	16.0 kft	069	zeros in transit fl16
111530		JW	17.0 kft	069	zero set
112254		video	17.0 kft	062	ffc & rfc to record
112658		jw nev	16.0 kft	058	zero
112712	112836	Run 1.1	16.0 kft	059	
113105	113410	Run 2.1	14.5 kft	270	
113836		TW power	14.5 kft	032	recycled - status light on
114428		JW Nev	14.5 kft	100	zeros
115057	115426	Profile 1.1	16.9 - 13.1 kft	140	
115611	120033	Profile 1.2	13.1 - 9.0 kft	032	
120155	120930	Profile 1.3	9.1 - 1.8 kft	277	
121054		TW	4.3 kft	271	TW power recycled
121807		video	11.0 kft	198	changed
121816	121932	Run 3	11.0 kft	199	
122338	122725	Run 4.1	11.5 kft	045	
123044	123457	Run 4.2	12.5 kft	248	
123846	124235	Run 4.3	13.5 kft	047	
124633	124813	Run 4.4	14.0 kft	227	
124655		jw nev	14.0 kft	245	zeros
125136	125336	Run 4.5	14.5 kft	051	
125303		probes	14.5 kft	054	zero
125455		probes	13.5 kft	070	zero
125706	130130	Run 4.6	13.5 kft	224	
130358	130850	Run 4.7	13.5 kft	356	
131206		DI rosemount	13.5 kft	280	heater on
131243	131518	Run 4.8	13.5 kft	282	
131847	132122	Run 4.9	11.5 kft	100	
132330		video	12.5 kft	008	tapes changed 13:20:0
132451	132728	Run 4.10	12.5 kft	269	
132536		jw zero	12.5 kft	271	132430
133428		di rosemount	8.0 kft	251	heater off
133804	134006	Run 5.1	8.0 kft	048	
133824		nev jw zero	8.0 kft	045	
134048	134429	Run 5.2	8.5 kft	066	
134805	135326	Run 5.3	10.0 kft	230	
134925		nev JW zeros	10.0 kft	214	
135715	140735	Run 5.4	11.5 - 12.1 kft	016	
135749		nev & jw zero	11.5 kft	026	
140359	140724	Run 5.5	12.0 kft	202	
141058	141357	Run 5.6	13.0 kft	044	
141827	142011	Run 5.7	13.5 kft	214	
142202		video	14.0 kft	184	video 4 started
142405	142549	Run 5.8	14.0 kft	025	
142513		jw nev zero	14.0 kft	031	
142927	143041	Run 5.9	13.5 kft	198	
143759	145201	Run 6.1	5.0 kft	216	
145552	150243	Run 7.1	0.53 - 0.69 kft	221	
152405		Land	0.47 kft	228	Cranfield
152938		gps	0.47 kft	309	52'04.36N 000'37.48W
153043		INU	0.47 kft	309	52'03.00N 000' 36.75W


Analysis chart valid 12 UTC FRI 09 SEP 2005
GEOSTROPHIC WIND SCALE
IN KNOTS FOR 4MB/4DEG AT 4 MB INTERVALS
POLAR STEREOGRAPHIC PROJECTION
N
70
60
50
40
L 984
H 1014
H 1022
L 1005
L 1000
H 1022
L 1008
H 1020
L 999
L 991
L 1000
H 1020
H 1020
MARIA
H 1024
L 1010
Met Office
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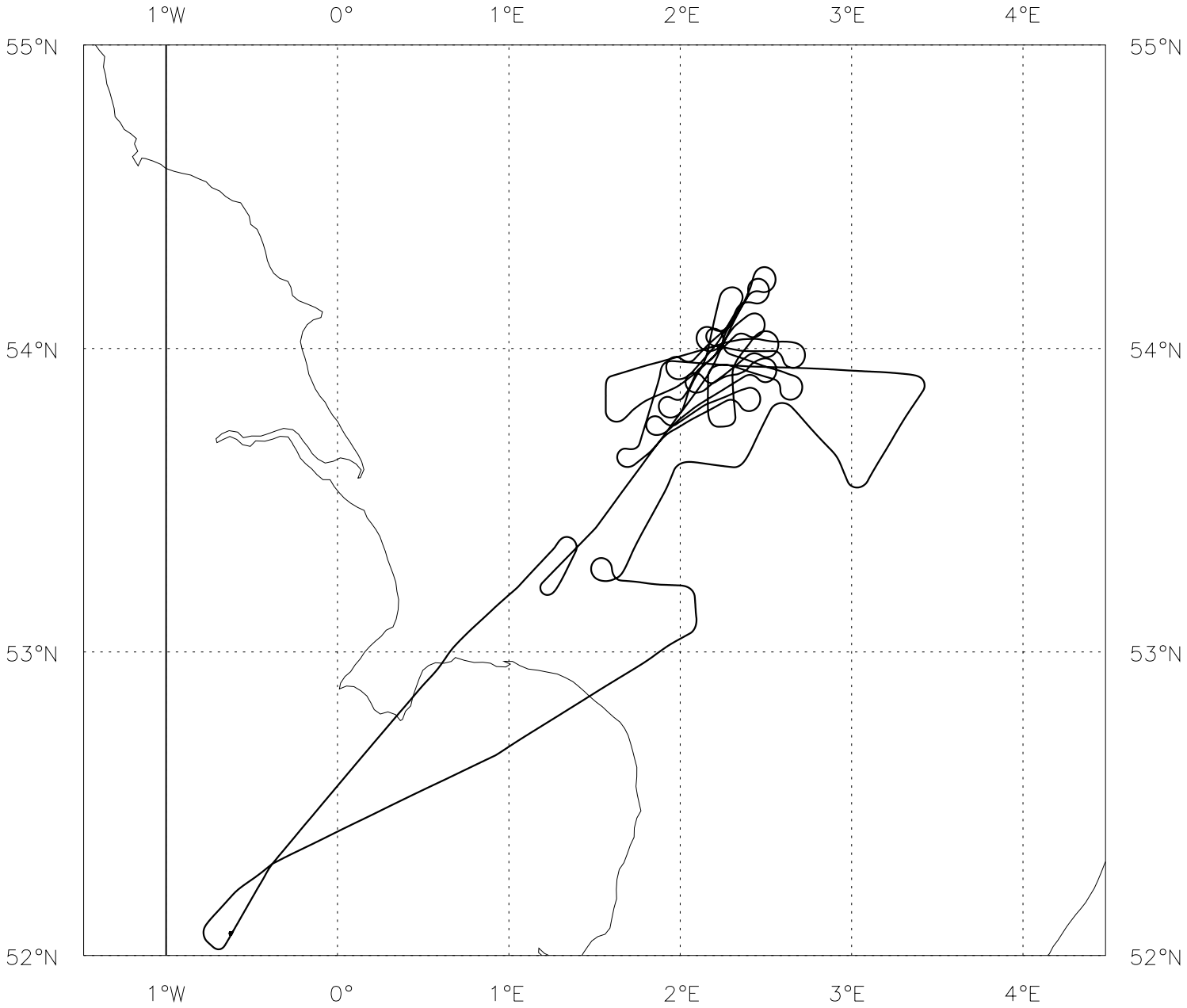
B127 Track 09-SEP-05



PROJECT BRIEF: ICEPIC – development of ice and precipitation in cumulus clouds.

Scientific Aims: The goal of ICEPIC is to understand and quantify the formation and growth of ice particles in cumulus clouds. We wish to examine:

- the formation of the first ice due to primary nucleation on ice nuclei (IN)
- the development of ice via secondary processes such as the Hallett-Mossop process, in which new ice particles are generated during the riming growth of ice particles
- other secondary ice production processes, such as evaporative break-up;
- the production of supercooled raindrops and their role in the glaciation process
- the dependence of these processes on the dynamics of the cloud
- the production of precipitation

As a first priority, in-situ aerosol and microphysical measurements from the aircraft will be gathered in close coordination with the CAMRa radar at Chilbolton, Hants. Measurements will be made in cumulus clouds when their tops are about 0°C through to when the tops have grown to about -20°C. The radar may identify columns of supercooled raindrops within the growing cumulus clouds that can be investigated more intensively by the aircraft.

Weather conditions: Developing showers that are forecast to have tops up to about -15°C, ideally within range of the Chilbolton radar (still operating after CSIP). A section of air free of ice crystals from higher or older clouds. It may be preferable to fly to an alternative region away from the radar if conditions are more suitable.

Safety: Regions that paint RED on the aircraft weather radar should be avoided. No flight into clouds known to be producing lightning. Information on current location of lightning (sferics) can be provided by FAAM using the NAMIS system.

Key instruments and their operation

Basic meteorology

- Rosemount temperatures, GE hygrometer
- GPS (including GPS Cruciform at 20 Hz), INU, turbulence probe
  When in supercooled liquid water, Flight Manager & PIs to monitor turbulence probe signals (TBPC & TBPD) for signs of icing (loss of variability, drop in signal). ICEX to be used on radome, water traps empty.
- J-W LWC and Nevzorov LWC/TWC.
  When straight & level in clear air, zero / calibrate and note in the Flight Manager's log.
- TWC profile ascents or descents should avoid cloud if possible

Cloud Microphysics & Aerosol

- FFSSP, 2DC, 2DP (or CIP-100) & PCASP.
  Normal monitoring to ensure correct operation. Operator should note particular features of interest eg. high concentrations, pristine ice crystal habits, large drops (d > 100 μm) in 2D imagery above freezing level.
- SID 2 operated in bursts of 5 minutes to coincide with passing through cloud (to prevent computer crashing)
- CPI as above
- CCN measurements should be made by filling the alleviator (2min reqd.) whilst in clear air either below, between or upwind of the cloud layer(s) of interest. Requires altitude to be held for the 10 min of sample & process.
- AMS minimum 2 min (~12km) reqd for size-resolved composition distribution (out of cloud or Option **B** runs) inlet change & on/off messages copied to Flight Manager's log.
- CVI below cloud base, normal operation is in aerosol mode. For cloud Option **B** and above cloud base, normal operation is in CVI mode to sample cloud particle residues into the AMS

Key instruments currently unavailable

- *Ice Nucleus counter*
  (INC) will normally be operated in clear air and under fixed conditions of temperature and supersaturation so as to maintain it in a stable condition. Allow additional time between runs for the operator to adjust it to different conditions.
- *FWVS {to preserve lamp life, switch off when dew point above –15°C}*
- *ADA & SID as for 2D probes*

Quicklook to include: TATD & N, DP, LAT, LON, LWC, NEVLW & TW, U, V, W, PHGT, HDG, TAS, TBPC & PD

SORTIE BRIEF: **ICEPIC** ICE and Precipitation Initiation in Cumulus clouds
Flight Number: **B127**
Date: **9th September 2005**
Mission Scientist: Jonathan Smith

Sortie Aims: To measure development of microphysics and dynamics in cumulus cloud systems.
Location: Amongst developing cumulus clouds within 1·5 hours transit of Cranfield. Likely area SE corner of UK, Area Echo extended south down English Channel to join Area Alpha. Area Alpha also possible with convection behind front over Cornwall, Devon and into Somerset.
Sortie Summary:

1. Characterise inflow atmosphere around and below developing cumulus – *where not done by CSIP*
2. Penetrate cumulus clouds, preferably near the top of growing turrets, through the updraught. All cloud penetrations should be *with wings level*. Three principal options are for:
   - **A** well-defined isolated clouds
   - **B** many clouds (RICO scenario)
   - **C** organised convection on a convergence line or a gust front.

Sortie Detail

1. Out-of-Cloud: only where not done by CSIP

1.1. Take off and climb for transit to the operating area. Locate suitable growing cumulus. 40+ min

1.2. Optional profile descent in clear air, 1000 ft/min, FL200 to 500 ft agl. If necessary step profile to stay in area. (Not required at Chilbolton) Set altitudes and directions for later†. *25 min*

1.3. Run at 500 ft agl, minimum time 10 min along suitable azimuth (across line or front for Option **C**) to sample inflow aerosols & IN. May require initial delay to settle instruments. 10 min

1.4. Ascend to 500 ft below cloud base and carry out 10 min run on suitable azimuth to sample inflow aerosols & IN. May require delay after ascent to settle instruments. 15 min

2. Cloud Work Options

Option A: Isolated *developing* clouds – ascend with clouds, near their top

A.1. Proceed to about 0° C altitude†, or below max cloud top if lower 5 min

A.2. Adjust altitude to 500 ft below cloud top and penetrate cloud. The penetration should be made at a constant azimuth and altitude. It is important to penetrate the growing turret, updraught, region. Once clear of cloud, continue run for 10 s then procedure turn to come back to same region of cloud as quickly as possible. 5 min

A.3. Repeat A.2 while appropriate, ascending with the top until growth stops or T = -20°C†
{ Vertical separation of repeats set to match growth of cloud} 45 min

A.4. Repeat runs at -3 to –8ºC T levels where practical, otherwise colder, to measure changes. 15 min

Option B: Many *developing* cumulus clouds – sample many clouds

B.1. Proceed to 0° C altitude†, or max cloud top if lower 5 min

B.2. Commence 10 min run in along shear direction†. Adjust track to randomly sample growing turret / updraught regions of cloud but without passing through RED radar echoes (reflectivities of 37 dBZ or greater). End run clear of cloud. 10 min

B.3. As time permits, repeat an ascent by -3° C† (*approximately* 1500 ft) followed by a run as in B.2 until the lowest of -15° C† or max cloud top is reached. (-3, -6, -9, -12, -15° C†) 75 min

Option C: Clouds with linear organization (eg. along a convergence line or gust front).

C.1. Proceed to 0° C†, or max cloud top if lower 5 min

C.2. Fly leg perpendicular to line, length as required. Adjust track to penetrate cloud tops or cell centres. End run clear of cloud. 2 min

C.3. As time permits, repeat a 180º turn and ascent followed by C.2. Ascent either; as **A** to 500 ft below cloud tops until -20° C† reached, or as **B** at fixed temperature levels. 30+ min

3. Repeat If time permits, for new developing cumulus carry out Option **A**, **B** or **C.**

Transit return at any suitable altitude. 40+ min

Ruth

00 44 1234
754 534

Mission Scientist's Log

Jonathan Smith

Flight No **B**.127 Date 9th September '05 Page 1 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
1100	t/o				hazy, "not light runable"
					7/8 Ci
1102	climb	4500			7/8 Ci haze layer top visible
					no Ci ahead (to East) Cs above
					Cu on horizon to N ahead
					more like Sc to south
1105					Cu don't look too high
1113		16000			-8°C, looks
1125					
					T is -8°C but high alt
					but see what is Ness
1133					layer cloud in front
					what did it have
					SID2 has problems
					supercooled from CPI + PFSSP
1154					skim top of dark As, thin
					very thin
115611	P1				recovery doesn't look like
					ATR on Research now
					CVI will go to "aerosol" mode
					at bottom of profile
					anything too much around at the
					moment to stop us carrying out
					low level run - (apart from
					cloud in Dutch airspace / danger
					area)

0°C at 700hPa
10,000 ft

Mission Scientist's Log

Flight No **B**127 Date 9th September '05 Page 2 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
12:00	P/	9k			Sc below - rain patches 7/8
					As 3/8
					weather too much cloud
					turn down
12:12					— INC has "failed" — data
					OK
1220					cloud going more than others
					just water on 1st run thro'
					from cloud physics + CPI
12059					v. hazy below, especially
					and the clouds
1223					that cloud died back to
					level of others so go for
					echo on far side & As
					at cld above our level.
12603					rain - lot of cloud before
					the echo
1227					end run still in cloud
					some more As so next run
					at climb 10000 ft.
	should be	interesting if			no ice on surface of As
1230					start run in tops of other
					clouds almost RICO like
end of	Run 12			just	out between layers of As
				CPI	saw some large ice

Mission Scientist's Log

Flight No **B** 127 Date ..... Page 3 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
1236	~~between~~	13.4k			-7°C - thin cloud higher than surrounding clouds
123758					picture of anvil cloud + before
					* picture of smaller cloud growing higher
1241		run through	As again		less bumpy thin tops
					out of cloud at end
					tops not growing vigorously
					on the outside of this system
1247					enter old turret - less echo
					but higher.
					come out of just on tops of
					cloud ∴ stop start of climb
					500 ft
2DC has noise on it					
1252					some tops at start of run
					then on towards main turret
					(picture) T = -7.7°C
1259					into main bit of cloud
					(bumpy!)
	come	5 to	Sally	also	of into ice
130525					turn
		just in	tops of		cloud - go back to
					old echo

Mission Scientist's Log

Flight No B.127 Date 9th September '05 Page 4 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
					back towards old echo
					ed back to water again
13:13	start			53.9 2.6	colder at this end of run
					tops now in this run
					(more clear sky a bit on this
					turn)
	not much	sign of a t			met on the turn
					near tops
radar tests done		lower			to pick up 00 are last run
at	2000 ft	lower to	see	what has happened.	
T was back at		-7.7 or so	when in the cloud - some		
attitude as before					
13:16:54	into run	11.5K			
			CPI	mainly	droplets + occasional large ice
					+ graupel
00 into	run	through	it at		+ 1000 ft. on turn in
13:24	the clear				run starts in cloud
		CPI	and	drops	+ some ice
into	bits of	haze			
run	down	line of		tracks	to a large clump at end
at	8000 ft				
	5.1				bit low so up 500 ft
	5.2				bits of cloud about on radar
	run at	+3°C	so	down	2000 ft to get to
	correct	altitude			

Mission Scientist's Log

Flight No **B**127 Date 9th September '05 Page 5 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
13:30:40					turn to line up with another transect
	CPI seems some ruined + evaporated ice at end				
	of line of clouds - before the end of the run				
13:58					
passes	thro small transect				+ onto biggo-one
					enter at 13:59 T = -4°C
CPI - "mostly water" + cloud physics					
14:03 under some As at start of run, into one transect					
			+ then another		
14:05					break thro into more cloud
14:06:50					to last small transect then turn
14:07					picture of cloud in danger
					area - it looks good.
14:11:10					1st transect is lower, got top
					- more than top when we read
14:13					it.
14:16:02					T - 6°C
					back to first transects
	end up just on one transect & got it done				
	into an extra descent				of 500 ft for last run
Now	descend to do				below cloud base run
	on straight back.				

Mission Scientist's Log

Flight No **B.127** Date 9th September '05 Page 6 of 6

GMT	Run / Profile	Height	Hdg	GPS Position	Remarks (clouds, weather, visibility, winds, sea state etc.)
					8/8 Sc in rolls
	6.1	5000ft			below cloud base by 500 ft
		because of cloud below			
1647					now clear down to sea
					below but running out of
					time to do low level run //
Hazy					
16:52					
	7.1	500 ft			for CCN over sea, not so
					hazy, some Cu visible
					above (?/8) on radar red
					echo to S of our track
~~					~~~~~
V. intermittent	CPI data -				TWC - no data
					Channel #1 on PCASP
probe pylon	vibration				→ noise due to air leak
FMMS - good.					
CCN?	dry filters				

FLIGHT NUMBER: B127	DATE: 10th Sept 05	OPERATOR: ~~Sonny~~ Crosier	Page 2 of 2
PROJECT: ICEPIC			

CCN LOG

ALLEVIATOR GMT ON	OFF	HEIGHT	TEMP INLET	1	2	STATIC 3	4	5		REMARKS
				1.75	2.5	3.5	4.25	5.5		
1443		5ft	~~3.75~~	~~0.50~~ 0.40		608	~~2397~~ 1		S	
				545					D	
				608					B	
				2397					R	
			~~100.1~~	100.1			1.05 1.36		P	
				~~3.75~~	~~4.5~~	5.5	6.25	7.5		
1443		5ft	~~3.75~~	~~0.5~~	0.71	~~1.06~~	~~1.40~~	2.0	S	
			~~4.5~~	543	546	537	546	540	D	
			~~18.48~~	608	610	610	609	608	B	
				2397	2399	2403	2406	2411	R	
			~~22.83~~	1001.2	1001.2	1001.2	1001.2	1001.2	P	
				1.75	2.5	3.5	4.25	5.5		
									S	
									D	
									B	
									R	
									P	
				3.75	4.5	5.5	6.25	7.5		← dT
1443		5kft	~~18.48~~	0.5	0.71	1.05	1.36	2.0	S	
			22.83	543	546	537	546	540	D	
				608	610	610	609	608	B	
				2397	2399	2403	2406	2411	R	
				1001.2	1001.2	1001.2	1001.2	1001.2	P	
				3.75	4.5					← dT
1456		500ft	22.5	1.75	2.5	3.5	4.25	5.5		
				0.5	0.70				S	
				541	546				D	
				604	604				B	Run
				2406	2414				R	abandoned
				1000.1	999.9				P	
									S	
1515	upon inspection the filters were still								D	
	in place.								B	
	However, the top filter was quite dry...								R	
									P	
				1.75	2.5	3.5	4.25	5.5		
									S	
									D	
									B	
									R	
									P	
									S	
									D	
									B	
									R	
									P	

CLOUD PHYSICS LOG

Flight No. B127 **Date: 05/10/05** **Operator: MAP** **Page 1 of 4**

G.M.T.	PCASP		FSSP	SID1	2D2-C			2D2-P			Remarks
DRS Time	Conc/cc	Mean R	Block Transfer	Particle Count	Conc/L	Max Size	Habit	Conc/m3	Max Size	Habit	
11:27:02											Start Run 1.1 @ FL160
11:28:00	35	0.06	28	2000	500	200	10	50001	800	10	
11:28:36											End of Run
11:32:48											Start Run 2.1 @ FL145
11:33:00	20	0.06		1							
11:34:15											End of Run
11:50:57	20	0.07	48								Start profile 1 from FL170
11:51:46	20	0.06									FL160
11:52:41	25	0.06									FL150
11:53:30	25	0.06									FL140
11:54:35	60	0.06	49								FL130
11:57:17	25	0.07		1							FL120
11:58:25	50	0.07		2							FL110
11:59:30	110	0.07		2							FL100
12:00:27	195	0.08		5							FL090
12:03:18	335	0.08		5							FL080
12:04:12	800	0.07		5							FL070
12:05:13	440	0.08		5							FL060
12:06:12	220	0.08		5							FL050
12:07:14	1400	0.09		5							FL040
12:08:17	2400	0.09		10							FL030
12:09:31	1300	0.08		5							End of Profile 1 @ FL018
12:17:52											Start Run 3.1 @ FL110
12:18:00	110	0.07	206	1							
12:19:31											End of Run
12:23:40											Start Run 4.1 @ FL115
12:24:00	Noise		262	1							
12:26:00	900	0.25	595	3000	30	800	1	100	800	1	
12:27:30											End of Run
12:30:43											Start Run 4.2 @ FL125
12:31:00	230	0.12	1142	2000	6	100	12				
12:33:00	3500	0.18	1671	3000	100	600	1	150	800	1	
12:34:54											End of Run
12:38:46											Start Run 4.3 @ FL135

CLOUD PHYSICS LOG

Flight No. B127 **Date: 05/10/05** **Operator: MAP** **Page 2 of 4**

G.M.T.	PCASP		FSSP	SID1	2D2-C			2D2-P			Remarks
DRS Time	Conc/cc	Mean R	Block Transfer	Particle Count	Conc/L	Max Size	Habit	Conc/m3	Max Size	Habit	
12:41:00	3500	0.15	2323	3000	25	75	12				SID 2 crash
12:42:35											End of Run
12:46:33											Start Run 4.4 @ FL140
12:48:00	100	0.06	2419		Noise						
12:48:16											End of Run
12:51:40											Start Run 4.5 @ FL145
12:52:00	200	0.06	2433	5000	Noise						Rearm 2dc to 1
12:53:35											End of Run
12:57:12											Start Run 4.6 @ FL135
12:58:00	100	0.09	2456	5000	65	450	1	1300	800	1	
13:00:00	1000	0.13	2821	3000	210	800	5	3000	400	11	
13:01:33											End of run
13:04:01											Start Run 4.7 @ FL135
13:05:00	100	0.07	3000	4000	230	100	12				
13:07:00	2800	0.20	3142	4000	860	200	10				
13:08:46											End of run
13:12:29											Start Run 4.8 @ FL135
13:13:00	1000	0.11	3550	100	350	800	5				
13:15:16											End of Run
13:18:42											Start Run 4.9 @ FL115
13:19:00	1500	0.15	3902	1000	470	300	10				
13:21:15											End of Run
13:24:36											Start Run 4.10 @ FL125
13:25:00	370	0.19	4212	2000	230	300	1	4000	1000	1	
13:27:00	1400	0.23	4338	2000	25	800	5				
13:27:34											End of Run
13:38:01											Start Run 5.1 @ FL080
13:39:00	190	0.12	4426	3000							
13:40:05											End of Run
13:40:45											Start Run 5.2 @ FL085
13:41:00	170	0.08	4433	3000							
13:43:00	460	0.21	4728	5000							
13:44:34											End of Run

CLOUD PHYSICS LOG

Flight No. B127 **Date: 05/10/05** **Operator: MAP** **Page 3 of 4**

G.M.T.	PCASP		FSSP	SID1	2D2-C			2D2-P			Remarks
DRS Time	Conc/cc	Mean R	Block Transfer	Particle Count	Conc/L	Max Size	Habit	Conc/m3	Max Size	Habit	
13:48:10											Start Run 5.3 @ FL1000
13:49:00	200	0.08	4944	10							
13:51:00	170	0.09	5128	3000	5	200	12				
13:53:00	1400	0.14	5258	3000							
13:53:28											End of Run
13:57:12											Start Run 5.4 @ FL115
13:58:00	60	0.09	5262	5							
14:00:00	320	0.20	5361	5000	7	200	12	130	1000	1	
14:01:07											End of Run
14:03:42											Start Run 5.5 @ FL120
14:04:00	80	0.06	5562	1							
14:06:00	70	0.10	5951	1							
14:07:20											End of Run
14:10:55											Start Run 5.6 @ FL130
14:11:00	25	0.06									
14:13:00	10	0.06	6004								
14:13:57											End of Run
14:18:24											Start Run 5.7 @ FL135
14:19:00	2500	0.12	6181	5000	150						
14:20:07											End of Run
14:24:01											Start Run 5.8 @ FL140
14:25:00	20	0.06	6204	1							
14:25:47											End of Run
14:29:20											Start Run 5.9 @ FL135
14:30:00	15	0.06	6232	1							
14:30:39											End of Run
14:37:57											Start Run 6.1 @ FL050
14:38:00	300	0.08	6269								
14:40:00	600	0.08									
14:42:00	700	0.08									
14:44:00	800	0.09									
14:46:00	700	0.09									
14:48:00	550	0.09									

CLOUD PHYSICS LOG

Flight No. B127 **Date: 05/10/05** **Operator: MAP** **Page 4 of 4**

G.M.T.	PCASP		FSSP	SID1	2D2-C			2D2-P			Remarks
DRS Time	Conc/cc	Mean R	Block Transfer	Particle Count	Conc/L	Max Size	Habit	Conc/m3	Max Size	Habit	
14:50:00	490	0.09									
14:51:58											End of Run
14:55:57											Start Run 7.1 @ 500'
14:56:00	460	0.07	6269	20							
14:58:00	700	0.08		30							
15:00:00	740	0.08		30							
15:02:00	1310	0.08		40							
15:02:44											End of Run
	PCASP flow rate = 1cc/sec PCASP excessive ch1 noise on occasions SEADAS time offset = 0 SID2 crashed several times 2dc noise due to icing making canisters vibrate										

CLOUD PHYSICS PROCESSING LOG

Flight number: B127
Date: 09/09/2005

A) FFSSP PROCESSING		
Processing Stage	Completed	Comments
1) Transfer *.txt files from DVD to PC B127_FFSSP_hh.txt for each hour of data B127_FFSSP_HVMS.txt		
2) FTP the files (ascii) from the PC to the directory PMSDATA: on FLOODS		
3) RUN MRFB:[PMS.FAST_FSSP]FSSP_EXTRACT_TAS a) Flight number: B127 b) Path name: MFDDATA:B127_MFDX c) Output directory: PMSDATA: d) Start time: 0 if unknown e) End time: 240000 if unknown		
4) RUN MRFB:[PMS.FAST_FSSP]FFSSP_PROCESS_TXT a) Flight number: B127 b) Directory: PMSDATA: c) TAS in processing: Y d) Vel threshold (clicks) 0 e) Calibration file: Use the most recent calibration file. Format FFSSP_CALddmmyyyy.txt Calibration files to be stored in MRFB:[PMS.FAST_FSSP] f) Adjust FFSSP time Y/N g) If Y, enter value to add to data time (seconds)		Note the calibration file used FFSSP_CAL23082005.TXT Yes only if gross errors occur in FFSSP time eg; ~ 1hour
5) In PVWAVE a) enter: !path=!path+',mrfb:[pms.proc]' Note that the comma before "mrfb" is important! b) write_procffssp_to_m5,'pmsdata:B127_procffssp.dat', 'mfddata:B127_mfdX','pmsdata:B127_m5procffssp',/auto 1st argument is output file from 5) 2nd argument is the MFD 3rd argument is the new FFSSP data file in M5 format		Note the correction applied to FFSSP time by /auto
c) exit		
6) MODIFY a) Modifying datasets: pmsdata:B127_m5procffssp b) Datset: mfddata:B127_mfdX c) New dataset: Enter updated MFD name d) Parameter description file: leave blank to use default		
7) CHECKS:		
i) FFSSP and JW/Nevzorov LWC – are they correctly synchronized in time?		
ii) If not, may be necessary to repeat 5b) using addt=x keyword. This adds x sec to FFSSP time.		
iii) Alternative at 5b) is to use ,auto=602 or auto=605 to align FFSSP with Nevzorov LWC or TWC.		

CLOUD PHYSICS PROCESSING LOG

Flight number: B127
Date: 09/09/2005

B) 2D PROCESSING		
Processing Stage	Completed	Comments
1) Transfer B127.dat file from CD/DVD to PC		
2) Zip up file on PC (B127.zip)		
3) FTP the zipped file (binary) from the PC to the directory SEADAS_DATA:[SEADAS_DATA] on FLOODS		
4) Log on to FLOODS		
5) unzip SEADAS_DATA:[SEADAS_DATA]B127.zip		
6) In PVWAVE i) !PATH=!PATH+',MRFB:[PMS.PROC]' ii) CONVERT_SEADAS_FILE a) Input file: SEADAS_DATA:[SEADAS_DATA]B127.dat b) Output file: SEADAS_DATA:[SEADAS_DATA] B127_seadas.dat iii) exit	13/02/06	Note the number of bad block reads and/or final numbers of blocks read & written Complete, 0 bad reads
7) run MRFB:[PMS.SEADAS]READM200_FILE a) Default directory: PMSDATA: b) Flight number: B127 c) Disk file name: SEADAS_DATA:[SEADAS_DATA] B127_seadas.dat d) Comment string: e) Start time: 0 if unknown f) End time: 240000 if unknown g) Read 2DC: Y h) Read 2DP: Y i) Secondary data Y j) FSP-SYNC: Y k) cmd.str: Y l) Auto time correction: N m) Full length secondary: N	13/2/06	Don't worry about lots of FORTRAN run-time errors as long as the program continues. These are format errors when writing to ascii files. Data ends ~151200
8) 2D image display and printing Quick look at image blocks if required In PVWAVE i) !PATH=!PATH+',MRFB:[PMS.PROC]' i) WAVE> IMAGEDISPLAY a) 2D directory name: PMSDATA: b) Flight number: B127 c) IWC plot: N d) Select probe: (1) 2DC (2) 2DP e) Start time: 0 if unknown f) End time: 240000 if unknown g) Time interval (sec): 0 for every image block nominal 5 sec		This section is optional Features to look for: 1) Noise on 2D-P – does it affect non-edge diodes (with potential to create spurious particle counts)? 2) Can you identify a dominant particle habit for the whole flight (eg. drops or crystals) 3)

Preparation of imagery for Core data product iii) WAVE> auto_image a) 2D directory name: PMSDATA: b) Flight number: B127 c) Enter date: YYYYMMDD d) Enter start time 0 if unknown e) Enter end time 240000 if unknown f) Enter time interval (sec) between successive imaged blocks 10 iv) exit PVWAVE Creates files	20 PMSDATA:	Operator log notes 2DC noise due to aerodynamic shaking. FAAM_YYYYMMDD_R0_B127_2Dx-IMAGES.PS
ftp *.PS files from PMSDATA: to PC		
Load each into Ghostview or other pdf-converter		
Output as pdf file (70 dpi resolution) and append name prefix of CORE-CLOUD-PHY_ to converted files	13/2/06	Files on O:/CloudPhysics Core data
9) run MRFB:[PMS.SPEC2D.AUTO]PROCESS2D_AUTO a) Flight number: B127 b) Directory: PMSDATA: c) File generation: Hit enter d) Time correction: Time offset of the 2D data	0	If program crashes at a certain Time, for any reason, re-run With that time as the new end.
e) TAS: Y f) MFD directory: MFDDATA:B127_MFDX g) Probe number: (1) 2DC (2) 2DP (0) Both 0 unless either probe known to be faulty h) Start time: Take-off or 0 if unknown i) End time: Landing or 240000 if unknown j) Nominal averaging: 0.2 seconds for conversion to M5 k) Particle type: 8 if known to be in ice cloud 11 if known to be in water cloud 8 if known to be in mixed-phase 8 if unknown l) Coefficient choice: 2 m) Output root filename: PMSDATA:B127_PROC2D	110500 151300 13/2/06	Look for realistic times in Flight Summary file or Cloud Phys operator log. Note the particle type Processing ends ~143000
10) In PVWAVE i) enter: !PATH=!PATH+',MRFB:[PMS.PROC]' Note that the comma before "mrfb" is important! ii) WRITE_PROC2D_TO_M5, 'PMSDATA:B127_PROC2D.DAT', 'PMSDATA:B127_M5PROC2D' iii) exit		Note: This will run quicker if you specify correct start / end times at 9h) and 9j).
11) MODIFY a) Modifying datasets: pmsdata:B127_m5proc2D b) Datset: mfddata:B127_mfdX c) New dataset: Enter modified MFD name d) Parameter description file: leave blank to use default	13/2/06	complete
12) CHECKS:		
i) Is 2DC/2DP IWC of comparable magnitude and well-correlated with Nevzorov TWC?		

CLOUD PHYSICS PROCESSING LOG

Flight number: B127
Date: 09/09/2005

C) PCASP PROCESSING		
Processing Stage	Completed	Comments
1) Complete stage 7) in 2D processing Ensures B127_FSP.DAT containing raw PCASP data is written to directory PMSDATA:		
2) run MRFB:[PMS.PCASP]PROCPCASP_NEW a) Flight number: B127 b) File name: PMSDATA:B127_FSP.DAT c) Root output name: PMSDATA:B127_PROCPCASP Produces PMSDATA:B127_PROCPCASP.DAT (binary) PMSDATA:B127_PROCPCASP.OUT (ascii) d) Minimum size channel: Default = 1 If smallest size channel are known to be noisy the value of the highest noise free channel to be entered here e) Calibration volume flow rate: Use the most recent value. Calibration files to be stored in **????** Entering zero gives default value = 1.0 cm3/sec f) Time correction: Same value as used in 2D processing stage 9 d) g) Start time: Take-off or 0 if unknown h) End time: Landing or 240000 if unknown	 1 1.0 110500 151300	Note the min size channel Note the volume flow rate But note ocnl noise in Ch.1 Look for realistic times in Flight Summary file or Cloud Phys operator log.
3) In PVWAVE i) enter: !PATH=!PATH+',MRFB:[PMS.PROC]' Note that the comma before "mrfb" is important! ii) write_procpcasp_to_m5,'pmsdata:B127_procpcasp.dat' ,'pmsdata:B127_m5procpcasp' iii) exit		Note: This will run quicker if you specify correct start / end times at 2g) and 2h).
4) MODIFY a) Modifying datasets: pmsdata:B127_m5procpcasp b) Datset: mfddata:B127_mfdX c) New dataset: Enter modified MFD name d) Parameter description file: leave blank to use default	 MFDA 13/2/06	 Left unchanged until FFSSP complete

CLOUD PHYSICS PROCESSING LOG

Flight number: B127
Date: 09/09/2005

D) NetCDF file preparation and ftp to BADC		
Processing Stage	Completed	Comments
1) Run TAREXEC:MFD_BADC		
For inputs below, just press ENTER to use defaults		Defaults in [square brackets]
a) MFD to convert: MFDDATA:B127_MFDX b) version number for BADC: r[0] c) Names file: TARDIS_ROOT:[CALTEXT.NETCDF]CP_NAMES.TXT d) Directory: [DATA_ROOT:[NETCDF]] e) File prefix: [core-cloud-phy_faam] f) File suffix: [ ] g) File for output: [core-cloud-phy_faam_yyyymmdd_rm_B127.nc]		As from 4c) above default NOT the default default default default Default name is generated
2) Ftp transfer to BADC - stage 1) creates two files: - core-cloud-phy_faam_yyyymmdd_rm_B127.nc - core-cloud-phy_faam_yyyymmdd_rm_B127.txt The *.txt file should be renamed to core-cloud-phy_faam_yyyymmdd_rm_B127_descrip.txt but this cannot be done on VMS as the filename is too long You should do it if the file is first transferred to a PC, or after it has been uploaded to the appropriate “incoming” directory at BADC a) ftp ftp.badc.rl.ac.uk b) login with username and password c) cd /incoming/faam/campaign-processed-core d) copy *.txt file as ascii e) copy *.nc and *2D-IMAGES.pdf files as binary		

E) BACKUP PROCEDURES		
Processing Stage	Completed	Comments
1) Backup the intermediate files created in PMSDATA: a) zip “-V” PMSDATA:B127*.* outdir:B127_PMSDATA.zip		Note destination directory “outdir”

AMS Inflight Log Sheet v2.00

DATE: 09.09.05 FLIGHT: B127 OPERATOR: G. Cappa

Time	Event
[illegible]	
1124	switch to CVI inlet.
1154	switched to 1min saving from 30s saving.
[illegible]	[illegible]
1157	off CVI inlet
1159	on rose mount inlet.
1211	off rosemount
1212	on CVI again.
1432	off CVI
1433	on rosemount

Flight Manager's Instrument Status Log

Flight No. **B** 127 Date: 09 September 2005

Instrument	Fitted	Operated	Instrument	Fitted	Operated
Navigation			**Cloud Physics**		
INU		**Y**	**Probes**		
XR5M GPS		**Y**	FFSSP		**Y**
Cruciform GPS		**Y**	PCASP		**Y**
Satcom C		**Y**	2D-P		**Y**
Satcom H		**Y**	2D-C		Y
Thermometers			Cloudscope		
De-Iced Temp		**Y**	SID 1		**Y**
Non De-Iced		**Y**	SID 2		**Y**
Heimann		**N**	HVPS		
Hygrometers			CIP25		
G. Eastern		**Y**	CIP100		
J. Williams		**Y**			
Nevzorov		**Y**			
TWC		**Y**			
FWVS		**Y**	**Racks:**		
Radiometers			INC		**N**
Upper Clear		**Y**	CCN / CNC		**Y**
" Red		**Y**	CVI		**Y**
" Silicon		**Y**			
" JO1D		**Y**	**Aerosol**		
Lower Clear		**Y**	PSAP		**N**
" Red		**Y**	Nephelometer		**N**
" Silicon		**Y**	Filters		**N**
" JO1D		**Y**	AMS		**Y**
Large Radiometers					
TAFTS		**N**			
MARSS		**N**			
DEIMOS		**N**	**Others:**		
ARIES		**N**	NIR TDLAS		N
SWS		N	2BT O3		N
Chemistry			VACC		N
Ozone		Y	PEROXIDE		N
SO2		Y	Formaldehyde		N
NOX		Y	ADA		Y
CO		Y	CPI		Y
ORAC		N	NOxy		N
PAN		N	PTRMS		N
PERCA		N	Bag Sampling		N
WAS		N	Tube Sampling		N

Faults / Incidents Log

Flight No. B127
Date: 09 September 2005

Instruments

1 Total Water Status light ‘on’ throughout flight. Status register bit 0 set low – ‘data counts out of range’
2 One incident of turbulence probe icing

Aircraft

1 Probe icing on starboard pylon caused vibration and visible shaking of pylon. Descended to clear ice; all returned to normal
2 Missing headset on core console
3 CVI intercom box may have failed – needs check

Satcom H Calls – Nil

MISSING LOG SHEETS:

The following logs are not available for flight B127:

Log	Reason
De-brief	Sortie De-brief yet to be created by Jonathan Smith
CVI	No log is ever taken for CVI
ADA/CPI	No log taken or no copy left with FAAM
FWVS	No log taken for FWVS

VIDEO RECORDINGS:

? x ????ward Facing Cameras
? x ????ward Facing Cameras

Digital8 video recordings from this flight reside with :

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